

PATENT SPECIFICATION

DRAWINGS ATTACHED



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COMPLETE SPECIFICATION

Convex Upper Platen for a Pulp Press

We, LAMB GRAYS HARBOR CO., INC., Blaine & Firman Streets, Hoquiam, Washington, United States of America, a Corporation of the State of Washington, United States of America, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to presses as used in the paper pulp manufacturing industry. More specifically the invention relates to improvements in presses of the kind for compressing chemical cellulose pulp bales in order to increase the density of the pulp and to decrease the thickness or space occupied by the bale; whereby a more favourable ocean freight rate may be obtained where rates are based on the space occupied by the freight rather than on its weight.

Explanatory to the various objects and advantages of this invention, it will here be pointed out that the manner of pressing a paper grade pulp bale is quite important for various reasons well known in the industry. A press, designed to properly press chemical cellulose bales, must be capable of applying a very light compressing pressure, or a high pressure sufficient to "dead press" the bale. In a modern high speed finishing room, the press generally limits the production rate. The cycle of the press and the "retention period" allowed for escape of air from the pulp bale under compression will determine the number of presses required to obtain a desired production. The retention period must be reduced as much as possible in order to get the shortest pressing cycle. During the last twenty years the "retention period" has been reduced from approximately 60 to approximately 15 seconds, by reason of utilising increased press pressures, but the using of increased pressures has resulted in production of a greater percentage of "stickers" and also has necessitated the installation of vacuum breaker plates on

the upper press platens in order to prevent, in the opening of the press, the lifting of the bale from the lower platen and an incident dropping of the lifted bale when the vacuum breaks.

The pressing of bales of dry pulp, especially at high speeds, involves a number of factors not ordinarily found in other pressing operations. For example, a pulp bale exerts a constantly increasing resistance to compression as the pressing progresses and also, by reason of "spring back" of the bale, exerts high but decreasing pressures on the press over a considerable distance as the press opens. The closing rate of a properly designed pulp press will decrease as the press pressure increases, so as to utilise the full power of the press motor over the entire closing cycle and the press must have an adequate means of decompressing the bale.

The principal object of this invention is to provide an improved form of press platen for a pulp press, whereby the present "retention period" for dissipation of air from the bale being pressed may be further reduced.

It is a further object of the present invention to provide a press platen with a bale-engaging surface which is contoured so that when a bale is being compressed air is not trapped in the bale and, further more, the exhaustion of air in the bale is expedited. It is also an object of this invention to so design the bale-contacting surface of the platen that the compression of the bale progresses from the inside areas to the outside areas thereby bringing about a faster outflow of air from the bale and avoiding compression of pulp fibres about the outer edge surface of the bale and thus permitting easier flow of air within and its outflow from the bale.

Yet another object of the invention resides in the provision of an improved press platen embodying the objects and advantages above recited, whereby under controlled pressures a perfectly flat top surface may be produced on

the pressed and finished bale without lengthening the retention period.

In order that the invention may be clearly understood it will now be described more fully, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 is an elevation of a typical pulp bale press embodying the present invention;

Fig. 2 is an enlarged sectional view of the platen, taken on line 2—2 in Fig. 1;

Fig. 3 is an enlarged sectional detail taken on line 3—3 in Fig. 2 showing vacuum breaking air channels and air escape ports;

Fig. 4 is a perspective view of the press platen of Fig. 1, removed from the machine and somewhat exaggerated in scale for better understanding and

Figs. 5 and 6, respectively, are perspective views of press platens of alternative forms.

The invention anticipates that a platen, embodying the present improvements, is applicable to presses of various designs, makes and mechanisms and it is not limited in its application to the type of press which is shown as being typical of pulp presses in general.

Before describing the present invention, attention will be directed to the fact that, in the usual form of pulp press, both the top and bottom platens have flat and parallel bale-engaging surfaces. As a result, the cellulose fibres in the bale are uniformly compacted since a uniform compacting pressure is applied over the entire top and bottom surface of the bale, and as a result, air in the bale is trapped between the fibres. Since the bale is porous, the air will gradually escape and as a result the fibres will bend to accommodate themselves to the spaces originally occupied by the compressed air.

It has been observed that with higher pressures and the increased speed of press closing, an increased length of retention period has been required. Actually, a shorter over-all press cycle was obtained by a slower application of pressure that avoided air trapping.

The basis of the present invention resides in so designing the contour of the platen that it first comes in contact with the centre of the bale surface as the press closes, subjecting the air contained therein at the centre to a greater pressure than at the edges, thereby bringing about a faster outflow of air from the bale, due to the delayed compression of the fibres around the bale edges.

In the normal pressing by use of flat-surfaced platens, the centre of the bale is apt to be left slightly convex, unless an excessive retention period is allowed; this by reason of compression of fibres about the bale edges while air is still trapped or held in the bale centre.

The platen according to the present invention reduces air trapping to a minimum and effects the progressive application of pressure to the bale from centre to the outer edges

thereof so that the outflow of air is expedited.

Referring more in detail to the drawings:—

The press, shown in Fig. 1 is typical of presses to which the present platen may be applied. It comprises a base frame structure designated, generally by reference numeral 10, an oppositely related upper structure 11 that is joined to and supported from the base frame structure by paired laterally spaced columns 12—12, disposed in parallel relationship. A cross-head 13 is slidably mounted on the columns 12—12 for movement toward and from the base frame. The base frame structure 10 is horizontally disposed and mounts thereon a bale supporting platform 10x upon which a pulp bale, designated at 14, is here shown to be properly disposed for pressing.

Any suitable means may be used for opening and closing the press as, for instance, a hydraulic cylinder indicated at 15.

Fixed to the under surface of the cross-head 13 is a press platen 16 embodying the improvements of the present invention. The platen shown more particularly, in Figs. 2 and 4, is of rectangular form, and has horizontal dimensions that are preferably slightly greater than the dimensions of the top surface of the bale 14 to be pressed. The platen is fixed to the underside of the cross-head 13 in such position as to symmetrically engage the top surface of the bale incident to the closing of the press against the bale. The top surface of the platen is flat and is seated flatly against and secured to, the under surface of the cross-head 13. The top surface is formed from edge to edge with a plurality of air escape channels 18 from each of which channels, air escape passages or holes 19 lead to the bale engaging surface of the platen as best seen in Fig. 3; these holes being at relatively close intervals over the platen surface.

An important feature of construction of this platen resides in the contour of its bale engaging surface. It is shown in Figs. 2 and 4 that the bale engaging surface is convex, both in its transverse and its longitudinal direction. However, it might, in some instances be convex in one direction only, as has been shown in the modified or alternative form illustrated in Fig. 5. It is also proposed that such platens might also be made with flattened pyramidal bale engaging surfaces as shown in Fig. 6. In this form of platen the pyramid has been merged into a spherically curved tip, as designated by reference numeral 20.

In the pressing of a pulp bale, in a press using the platen of Figs. 2 and 4, the problem of exhausting air thoroughly from the bale through highly compressed fibres is accomplished. The same advantages reside in use of the platens of Figs. 5 and 6 by reason of the progressive application of pressure from the bale centre outwardly.

The vacuum breaking details of the platens are not necessary to the operation of exhaust-

ing air from the bale, but are necessary to a satisfactory commercial operation of the press. The combination of the platen surface contour and the vacuum breaking features are quite desirable in order to obtain a shorter retention period; a satisfactory flat surface on the bale, and a satisfactory release of the pressed bale in the opening of the press.

WHAT WE CLAIM IS:—

1. A pulp bale press of the kind referred to comprising a fixed means for support of a stack of pulp sheets, or the like, a vertically movable platen disposed for movement against the top surface of the stack, means for applying a downward stack compressing force to the platen, the platen including an upper surface and a stack engaging surface, the stack engaging surface being so formed as to initially engage the top surface of a stack at a medial point or line and to progressively engage the top surface toward the peripheral edges thereof, a plurality of air ports leading upwardly through the plate from the stack engaging sur-

face toward said upper surface, and horizontal air channels formed in said upper surface and opening to the peripheral edges of the platen and to the air ports.

2. A press according to claim 1, wherein the platen is formed, or provided with, a bale engaging surface which is convex both in its transverse and longitudinal directions.

3. A press according to claim 1, wherein the platen is formed, or provided with, a bale engaging surface which is convex in one direction only.

4. A press according to claim 1, wherein the platen is formed or provided with a bale engaging surface which is shaped as a downwardly pointing pyramid.

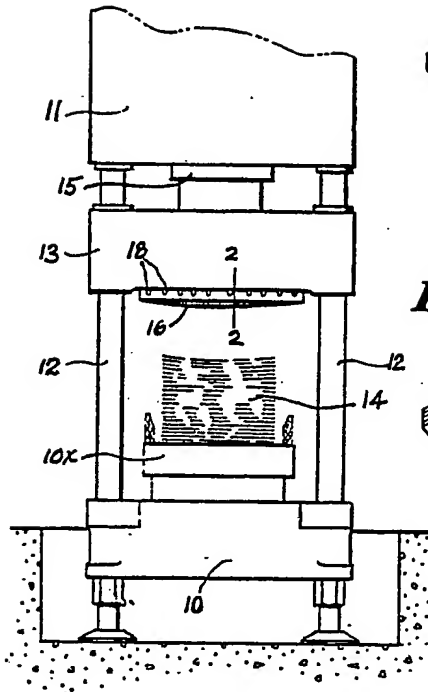
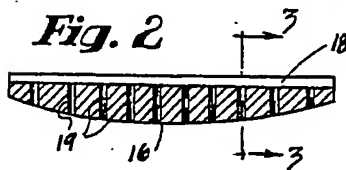
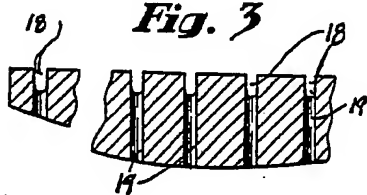
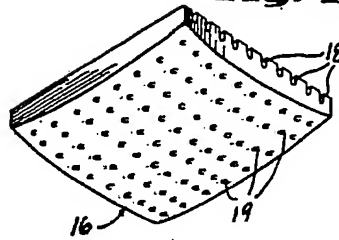
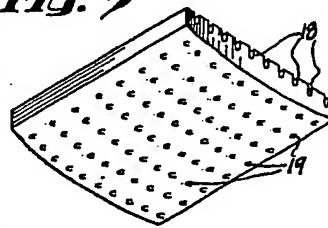
5. A pulp bale press substantially as herein described with reference to the accompanying drawings.

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Fig. 1**Fig. 2****Fig. 3****Fig. 4****Fig. 5****Fig. 6**